

Department of Biology Course Outline

BIOL 2070 3.0 A Research Methods in Cell and Molecular Biology Fall 2016

Course Description

This course focuses on laboratory techniques in the life sciences. Practical research skills are developed through experiential learning using current biochemistry, cell and molecular biology techniques. Research skills include scientific writing, data analysis/interpretation, experimental design and hypothesis testing. One lecture hour, six laboratory/practical hours per week. One term. Three credits.

Prerequisites

SC/BIOL 1010 6.00, or SC/BIOL 1000 3.00 and SC/BIOL 1001 3.00; SC/CHEM 1000 3.00 and SC/CHEM 1001 3.00.

Course Instructors and Contact Information

Dr. Y. Sheng
Course web site: <https://moodle11.yorku.ca>
Course email: biol2070@yorku.ca

Schedule

This is a **Blended** Course. The lecture component will be held online and Laboratory component will require face-to-face meetings.

Modules

Module 1: Genetics (wet) in Life Sciences Building (LSB) 221
Module 2: Cell Biology (wet) in Life Sciences Building (LSB) 223
Module 3: Biochemistry (wet) in Life Sciences Building (LSB) 225
Module 4: Scientific Writing (dry) rooms to be announced

The Life Sciences Building (LSB) is new and located behind the Petrie and Chemistry buildings. Wet labs will be on the 2nd floor of the LSB and can be accessed starting on September 10, 2013. Please use the designated entrance and make your way to the 2nd floor.

Evaluation

Lab Mark Breakdown

Lab	Percent (%)
Genetics (Wet)*	20
Microscopy (Wet)*	20
Biochemistry (Wet)*	20
Scientific Writing (Dry)	20
Final Exam	20
Total	100

Important Dates

For important dates such as holidays, refer to the "Important Dates" section of the Registrar's Website at <http://www.yorku.ca/yorkweb/cs.htm>

Resources

Course web site: <https://moodle11.yorku.ca>

BIOL2070 Resource Book:

Robert H. Reed, David Holmes, Jonathan Weyers, Allan Jones (2007) Practical Skills in Biomolecular Sciences, 3rd ed. Pearson Education.

Learning Outcomes

Upon successful completion of this course, students should be able to perform:

- Experimental design and hypothesis testing;
- Data interpretation, including standard curve interpolation (graphing) and determining molecular weight of an unknown protein or genotype;
- Critical thinking and assessment of current scientific publications;
- Scientific writing of results and data analysis;
- Use of model organism(s);
- Spectrophotometry, chromatography and enzymatic assays;
- Making dilutions and buffers;
- Genetic engineering in microorganisms (e.g., bacteria, yeast);
- Protein analysis via SDS-PAGE;
- DNA analysis, including DNA extraction, use of restriction enzymes, polymerase chain reaction and gel electrophoresis;
- Identification of genetic inheritance patterns based on genotype and phenotype including sex-linked traits;
- Fluorescence microscopy procedures and identification of cellular components

Course Content

In each module, learning will be evaluated in following formats:

Lab Quizzes

Quizzes are based upon material from the current lab. In some cases the dry lab will refer you to material in your textbook, which is considered testable material. Lab quizzes will take place in the lab or online.

Mini Assignments

On occasion there may be a short assignment in a wet lab session. These are designed to reinforce concepts and knowledge presented during the lab exercise.

Experimental Data Analysis

At the end of EACH wet lab session you MUST have your experimental data initialed by your TA (including numerical data and descriptive observations).

Lab reports

Communication is an important art of science. You are expected to write part or complete lab reports to summarize your experimental data.

All lab submissions should be well-organized, in good English, and bound together with your raw data sheets and any other required material (e.g., flow- sheets, rough sketches of graphs).

University Policies

Academic Honesty and Integrity

York students are required to maintain the highest standards of academic honesty and they are subject to the Senate Policy on Academic Honesty (<http://secretariat-policies.info.yorku.ca/policies/academic-honesty-senate-policy-on/>). The Policy affirms the responsibility of faculty members to foster acceptable standards of academic conduct and of the student to abide by such standards.

There is also an academic integrity website with comprehensive information about academic honesty and how to find resources at York to help improve students' research and writing skills, and cope with University life. Students are expected to review the materials on the Academic Integrity website at - <http://www.yorku.ca/academicintegrity/>

Access/Disability

York University is committed to principles of respect, inclusion and equality of all persons with disabilities across campus. The University provides services for students with disabilities (including physical, medical, learning and psychiatric disabilities) needing accommodation related to teaching and evaluation methods/materials. These services are made available to students in all Faculties and programs at York University.

Student's in need of these services are asked to register with disability services as early as possible to ensure that appropriate academic accommodation can be provided with advance notice. You are encouraged to schedule a time early in the term to meet with each professor to discuss your accommodation needs. Please note that registering with disabilities services and discussing your needs with your professors is necessary to avoid any impediment to receiving the necessary academic accommodations to meet your needs.

Additional information is available at the following websites:

Counselling & Disability Services - <http://cds.info.yorku.ca/>

Counselling & Disability Services at Glendon - <http://www.glendon.yorku.ca/counselling/personal.html>

York Accessibility Hub - <http://accessibilityhub.info.yorku.ca/>

Ethics Review Process

York students are subject to the York University *Policy for the Ethics Review Process for Research*

Involving Human Participants. In particular, students proposing to undertake research involving human participants (e.g., interviewing the director of a company or government agency, having students complete a questionnaire, etc.) are required to submit an *Application for Ethical Approval of Research Involving Human Participants* at least one month before you plan to begin the research. If you are in doubt as to whether this requirement applies to you, contact your Course Director immediately.

Religious Observance Accommodation

York University is committed to respecting the religious beliefs and practices of all members of the community, and making accommodations for observances of special significance to adherents. Should any of the dates specified in this syllabus for an in-class test or examination pose such a conflict for you, contact the Course Director within the first three weeks of class. Similarly, should an assignment to be completed in a lab, practicum placement, workshop, etc., scheduled later in the term pose such a conflict, contact the Course director immediately. Please note that to arrange an alternative date or time for an examination scheduled in the formal examination periods (December and April/May), students must complete an Examination Accommodation Form, which can be obtained from Student Client Services, Student Services Centre or online at

http://www.registrar.yorku.ca/pdf/exam_accommodation.pdf (PDF)

Student Conduct in Academic Situations

Students and instructors are expected to maintain a professional relationship characterized by courtesy and mutual respect. Moreover, it is the responsibility of the instructor to maintain an appropriate academic atmosphere in the classroom and other academic settings, and the responsibility of the student to cooperate in that endeavour. Further, the instructor is the best person to decide, in the first instance, whether such an atmosphere is present in the class. The policy and procedures governing disruptive and/or harassing behaviour by students in academic situations is available at - <http://secretariat-policies.info.yorku.ca/policies/disruptive-and-or-harassing-behaviour-in-academic-situations-senate-policy/>